**Abstract**

A child's early school years provide a crucial platform for them to develop fundamental movement skills (FMS), yet it has been acknowledged that there is a shortage of suitable FMS assessment tools for teachers to use within schools. To begin to address this shortfall, the purpose of this study was to elicit expert recommendations for the design of a FMS assessment tool for use by primary school teachers. A multi-phase research design was used, involving two scenario-guided focus groups with movement experts (n=eight, five academics and three practitioners). Data captured in both focus groups were transcribed verbatim and thematically analysed. Three dichotomous dilemmas emerged from the data in relation to assessing children's movement competence: (1) *Why*? For research purposes or to enhance teaching and learning? (2) *How*? Should the assessment setting be engineered or natural? (3) *What*? Should the detail of the assessment be complex or simple and should the nature of the tasks be static or dynamic? These findings suggest that any future development of movement competence assessment protocols for use by primary teachers needs to consider the specific purpose and context of the assessment.

**Keywords**

Fundamental movement skills, movement competence, movement assessment, primary teachers

## Introduction

Children's experiences within their early school years provide a crucial platform for them to develop fundamental movement skills (FMS) (Morgan et al., 2013), which include locomotor (e.g. hopping and running), object-control (e.g. throwing and catching) and stability (e.g. static and dynamic balance) skills. FMS (also referred to as fundamental/gross motor skills) are learned movement patterns that are considered the foundation for more complex, specialized skills (Gallahue, Ozmun and Goodway, 2012) and enable successful participation in a variety of physical activities and sports (Haubenstricker and Seefeldt, 1986; Stodden et al., 2008). The degree of skilled performance across a range of FMS reflects a child's 'movement competence' (Barnett et al., 2016), which, for the purposes of this paper, is a global term used to describe goal-directed human movement (Robinson et al., 2015). Proficiency in performing a range of FMS (e.g. catching, throwing, running) reflects a child's movement competence (Barnett et al., 2016). Our ability to understand children's movement competence has wide reaching consequences; for example, the lack of recognition of motor difficulty could lead to later social and behavioral difficulties (Cantell et al., 2003). Furthermore, there is growing evidence that supports the positive relationship between movement competence and physical activity during early childhood (Catuzzo et al., 2016; Logan et al., 2015; Lubans et al., 2010; Stodden et al., 2008), albeit with the premise that cause and effect is suspected but, as yet, not conclusively demonstrated (Holfelder and Schott, 2014). As increasing children's physical activity is a key driver in maintaining healthy weight, amongst the escalating prevalence of obese and overweight children (Figueroa and An, 2017), there is a further emphasis on prioritizing the development of children's FMS.

International policy directives have sought to clearly articulate the importance of children's movement development under the recent gambit of physical literacy (Canada Sport for Life, 2016; Department for Education, 2013; Ontario Ministry of Education, 2015; Society of Health and Physical Educators America, 2016; Youth Sport Trust, 2013). Whitehead (2016) defined physical literacy as 'the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life'. Within this definition, the main area of concern for this study was 'physical competence' as manifested through a child's movement competence and specifically how best to assess children's movement competence. Recommendations from a recent evaluation of the impact of the 'Start to Move' programme on children's FMS competence in the United Kingdom suggest teachers should become more involved in the process of assessing children's FMS (Morley et al., 2015). Teachers participated in the intervention, which was a one-day, movement-based, teacher-training course to more effectively support children's movement development in Physical Education (PE) lessons, but only observed the movement assessment framework (Bruininks Oseretsky test 2-short form; Bruininks and Oseretsky, 2010) that was used by a team of trained researchers (Morley et al., 2015).

Whilst there is sufficient empirical and policy-framed evidence to suggest that the development of children's movement competence is important for the overall development of the child, what is less articulated is which environment provides the optimal context for movement assessment to occur and the type of assessment that should be used. As Dudley (2015) suggests, understanding the context in which a child's movement is developed and assessed is as important as any intervention used to support the child's development.

A recent systematic review by Morgan et al. (2013) suggests that the school provides an optimal environment for the development of children's movement competence to occur, albeit with the involvement of highly trained or specialist teachers in intervention delivery. More specifically, the use of goal-directed motor skills teaching interventions in primary schools has resulted in significant improvements in children's movement competence during recent studies (Chen et al., 2016; Cicović et al., 2015; Platvoet et al., 2016). Other studies demonstrate that, given appropriate training, teachers of children in early years (Robinson and Randall, 2015) and secondary school (Lander et al., 2015) settings can have a positive impact on children's movement competence.

In PE within schools, it has been suggested that quality assessment is achieved when it is directly related to curriculum and pedagogy, with equal levels of enactment of these three message systems, in a way that offers socially just approaches to assessment (Hay and Penney, 2009). A socially unjust approach could be viewed as assessment being used as part of performance and accountability measures, rather than for learning (Dinan Thompson and Penney, 2015). Furthermore, Hay and Penney (2009) drew from the work of Bernstein (1971) to explain these message systems as the means of selection, classification, transmission and evaluation of educational knowledge.

There is a raft of movement assessment frameworks that have been validated, refined and used extensively by researchers across the globe to understand the movement competence of children (see Cools et al., 2008, for a review of movement assessment frameworks). Such assessments adopt a product, process, or hybrid-oriented approach with advantages and disadvantages of each method portrayed when assessment models are intended for non-specialist teachers of PE (Stodden et al.,

2008; Tidén, Lundqvist, and Nyberg, 2015). It has been suggested that there is a shortage of suitable FMS assessment tools for teachers to use within schools (Cools et al., 2008), predominantly caused by the clinical, and therefore inappropriate, design of existing assessments (Giblin, Collins and Button, 2014). Moreover, it could be suggested that the large amount of time it takes to administer existing assessments, the levels of complexity involved in understanding the wide-ranging criteria and the costs associated with purchasing such assessement protocols further restricts teachers using them to assess children's movement competence in their schools.

Recommendations have been made to evaluate the feasibility and reliability of movement assessment frameworks when administered by assessors with less movement analysis experience (Longmuir et al., 2015). Whilst Morgan et al. (2013) suggest that it is imperative that practitioners accurately assess children's movement competence, there is a lack of evidence to support their notion that 'Physical Education teachers often administer assessments into their programs to measure motor competence...' (p.48). Chen et al. (2016) and Hermmann et al. (2015) involved teachers in the assessment of children's movement competence, rather than solely using trained researchers. Although teachers underwent training to administer the assessment in Chen's (2016) study, failure to use inter- and intra-rater objectivity and test-retest reliability makes it difficult to assess the efficacy of the teachers' assessments. Hermann and colleagues (2015) developed a movement competence assessment (Motorische Basiskompetenzen, MOBAK) explicitly to be used in instructional practice by teachers and aligned to the PE curriculum. The authors concluded that the MOBAK test battery was suitable for the evaluation of the potential effect of PE in improving children's movement competence, as 'the testing procedure is fast, the test items are easy to evaluate, and the results are interpretable

without a standard table and statistical distribution. Participating teachers reported a high acceptance of this battery' (Hermann et al., 2015, p.89). Within this study, it is difficult to determine how ‘high acceptance’ was measured, with a lack of meaningful understanding of the alignment of the movement items to the curriculum being taught and how the results were interpreted and used by the teachers. Whilst we commend the authors for venturing into this much-needed field of research, there remains more questions than answers in terms of understanding the potential role of teachers as movement analysts.

There remains a distinct lack of teacher-oriented children’s movement competence assessment tools. One method of gathering knowledge and understanding on the design of a movement assessment framework for use by teachers in a school setting would be to elicit expert opinion on the matter. Previously, expert opinion has typically been captured through the use of a Delphi technique (RAND, 1967). For example, Ross et al. (2014) used a Delphi technique with motor experts to determine which were the most important aspects of motor development for use with pre-service PE teachers. Expert advisory groups have also been used at the design stage of movement assessment development to recommend an appropriate course format for the administration of a movement assessment framework (Longmuir et al., 2015). It is not clear what method was used to analyse and extrapolate experts' data in this early development phase, with only iterative, descriptive, accounts offered of the process. Whilst expert opinion has been sought, to varying degrees, in the development of previous movement assessment frameworks, there remains a lack of qualitative expert perspectives on the development of such assessments, particularly when couched for use within a specific setting.

Therefore, this study offers a unique opportunity to explore expert perspectives on the design of a movement assessment framework for teachers to use in primary schools, with children aged five-seven years.

## Methods

This study adopted a qualitative approach to better understand and capture expert opinion. The data are derived from a sample of five expert academics (three female, two male) and three expert practitioners (two female, one male). The intention was to get to 'know well' a few participants rather than know little about many. The use of focus groups allowed for the construction of meaningful themes, with the subsequent illumination of these themes through the contextual interaction elicited through participation. Philosophically, we do not claim that the themes that were constructed from the data are generalizable to all movement assessment experts or practitioners. However, we would encourage researchers and readers of this paper to appreciate that the emerging themes should be afforded time and contextual appreciation (see Lincoln and Guba, 1985). The findings of this work have been constructed through interactive dialogue and are presented in a way that demonstrates the evolution of the conversation, encouraging the reader to recognize similar situations which may (or may not) resonate with their own thinking and/or experiences. At a minimum level, the results will stimulate debate among academics and practitioners alike to develop our collective understanding of teacher-oriented assessment of FMS. The small group size and concentrated discussion that focus groups promote (Krueger and Casey, 2009) was deemed appropriate as it would provide a thorough examination of the topic to inform the development of a movement assessment framework and was

similar to other studies that explored assessment in primary schools (Ní Chróinín and Cosgrave, 2013).

The research was granted ethical approval by the Research Ethics Committee of Liverpool John Moores University (Ref. 15/EHC/027). Participants were informed that their involvement would be anonymous throughout the study and signed informed consent was obtained from each participant prior to commencement. One focus group took place at a university in the North of England and the second focus group was hosted at a university in Ireland. Each focus group was segmented into approximately three sessions of ninety minutes, lasting a total of five hours in duration, yielding a total of ten hours of data captured across the two focus groups. In both focus groups, the lead author, experienced in managing focus groups, acted as moderator, with the second author taking the role of facilitator. To protect their anonymity, participants have been given an identifying code during the reporting and discussion of the results.

*Participants*

As the study aimed to consider expert opinions on the design of a movement assessment framework for primary school teachers, it was deemed appropriate to include practitioners with experience of primary school education programs, as well as academics with expertise in children's movement development, in a similar way to other studies in this field (Barnett et al., 2015; Frances, et al., 2016; Ross et al., 2014; Rudd et al., 2015). Primary school teachers were subsequently included in the wider research programme as crucial participants in ensuring we gained a full and rich insight into the development of the movement assessment framework; these findings will be reported separately. Participants located in the United Kingdom and Ireland

who met the criteria for each group (practitioner or academic) were purposefully selected (Patton, 2002) to take part.

*Practitioner experts*. For the purpose of this study, practitioner experts were defined as such if they had significant experience in a senior, developmental role within primary PE teacher education and children's movement development. In the absence of quantifiable metrics used to define academic experts (e.g. peer-reviewed outputs; see Table 2), the way that we have defined practitioner experts highlights the significance of experience and is substantiated within the conceptual framework of a community of practice (CoP) (Lave and Wenger, 1991). CoPs involve the generation and sharing of knowledge, skills and understanding within a specific context. As our participants have fulfilled a number of senior roles within the primary school PE CoP over a significant period of time, we can confirm their status as practitioner experts (see Table 1).

[Insert Table 1 here]

*Academic experts.* Academic experts were identified and recruited if they had explored the assessment and/or development of children's movement competence in the UK through: (i) publications in peer-reviewed papers; (ii) published textbooks (author or chapter) examining the assessment and/or development of children's movement competence; and/or (iii) delivery of movement development within PE teacher education programs.

Prospective participants for the academic experts' group were identified and shortlisted via online databases using the search terms 'movement competence', 'fundamental movement skills' and 'movement skill assessment'. Invitations included

an introductory letter, participant information sheet and consent form, which were sent via email to an initial list of 12 participants. One participant from the original list failed to respond and six declined to participate. See Table 2 for a description of the academic experts focus group participants sample.

[Insert Table 2 here]

Each focus group was independently conducted with practitioners or academics. Retaining homogeneity within the two focus groups allowed us to gain the perspectives of participants with practitioner and academic expertise, without the discussion being influenced by their different experiences afforded by their role (Krueger and Casey, 2009). Similarly, we wanted to avoid the potential for participants' contribution within the focus groups to be influenced by their perceived importance in relation to other participants (Krueger and Casey, 2009), as could have been caused by combining practitioners and academics.

The practitioner focus group was conducted first, allowing an assessment model to be developed based on the recommendations of participants who have experience working closely with schools and teachers. Subsequently, these recommendations for a best fit assessment model for teachers were shared with the group of academics to evaluate the accuracy and reliability of this proposed assessment. As the primary aim of this research was to inform the development of a user-friendly movement assessment framework, we believed that practitioners' perspectives were an important starting point to achieve such an aim as they were the intended end-users. Furthermore, the vast majority of work in the field of assessing children's movement competence is conducted by academics with the aim of either establishing baseline movement competence or evaluating the efficacy of movement

development interventions. So, ensuring that the end-user was prominently positioned in the sequencing of data capture was crucial in challenging the status quo of existing research in this field.

***Data collection and analysis***

Two scenario-guided focus group workshops were conducted and recorded using an electronic voice recorder. Prior to the focus groups, the two lead authors created a framework of activities to guide the focus group sessions. The formation of topics and questions were guided by existing literature examining children's movement assessment (Cools et al., 2008; Giblin, Collins and Button, 2014; Hermann et al., 2015) to examine the critical considerations for assessing children's movement during curriculum time. As the focus groups were involved in the activities for a long period of time, maintaining engagement of all participants was deemed important. Scenario-guided focus groups require the completion of activities that actively engage participants (Krueger and Casey, 2009). Colucci (2007) suggested that scenario-guided focus groups encourage engagement in the discussion and maintain interest throughout the session. Furthermore, scenario-guided focus groups have been adopted to explore topics of working practices with nurses, which had previously not been studied in any depth (Church and Ekberg, 2013). Activity-led discussion was implemented to explore the participants' experiences more widely, as well as providing an environment to gain perspectives from both practitioner and academic experts (Colucci, 2007). Thus, adding a descriptive account to the limited empirical research involving movement experts in discussing movement competence assessment.

A multi-phase data collection and analysis process was implemented (see Figure 1) to allow the authors time following the first focus groups to analyse the findings. The practitioner focus group was conducted first, allowing an assessment model to be developed based on the recommendations of participants who have experience working closely with schools and teachers. Subsequently, these recommendations for a best fit assessment model for teachers were shared with the group of academics to gain their perceptions of the accuracy and reliability of this proposed assessment.

[Insert Figure 1 here]

*Practitioner experts' focus group procedure*. The practitioner experts' focus group was established to answer the following research question from the perspective of a teacher:

i. What are the key issues that need to be considered for the development of a teacher-oriented movement competence assessment of children aged four-seven years old?
ii. How can these issues be resolved in the creation of a teacher-oriented movement competence assessment?

Initially, participants were asked to create a list of the key issues arising for teacher-led assessment of the movement competence of children aged four-seven years old. Subsequently, participants were asked to rank these issues in the order of priority that they felt most important, and offer solutions on how these issues could be resolved. Concluding the focus group, participants were asked if there was anything they would like to add, that hadn't previously been discussed during the session.

*Data analysis one: Practitioner experts' focus group.* Transcripts were transcribed verbatim, read by the lead author and deductively analysed (Patton, 2002) using a qualitative thematic framework (Braun and Clark, 2006) shaped by the critical considerations and recommendations highlighted in the notes taken by the two researchers during the focus group. Following this, the lead author and second author individually re-read the transcripts to allow new, more inductively derived, themes to emerge. The lead author read all of the transcripts again, considering the revised framework of emergent themes and subthemes.

From this completed analysis, a storyboard model of the assessment tool was digitally created (Figure 2). This storyboard was subsequently shared within the academic experts' focus group to guide the activities and stimulate discussion.

[Insert Figure 2 here]

*Academic experts' focus group procedure.* The second focus group, conducted with academic movement experts (n=five), took place eight weeks after the first focus group. The purpose of the focus group was to:

i. Gain expert opinion to understand how to manage the critical considerations and their solutions posed by practitioner experts to create an accurate and reliable teacher-oriented assessment of children's movement competence.
ii. Establish the most effective protocol for teachers to accurately and reliably assess children's movement competence.

Scenario-guided activities (Colucci, 2007) were implemented within the session to engage the participants to address issues related to the accuracy and suitability of teacher-led assessment of children's movement competence (see Figure 3 for an example of one of these activities). Within these activities, participants were asked to

critique the storyboard and describe how appropriate the model was for primary school teachers. Sharing the storyboard provided focus and stimulated the discussion in ways that may not have occurred during conventional focus groups (Cross and Warwick-Booth, 2015).

[Insert Figure 3 here]

*Data analysis two: academic experts' focus group*. The data analysis for the academic focus group followed a similar process as for the practitioner experts' group. Following the academic experts' focus group, the facilitator and moderator met to share their written notes and to summarise the key issues highlighted from the discussion. These topics of discussion formed the key themes in a thematic framework. Transcripts from the academic experts' focus group sessions were subsequently deductively analysed by the lead author using a qualitative thematic approach (Braun and Clark, 2006). A cross-check of themes and sub themes between the practitioner and academic experts' focus groups was conducted by the lead author. When analysis of both transcripts had been completed, the facilitator and moderator met to review the themes and supporting quotations from both focus groups. This process allowed similar themes to be collapsed, thus establishing, by consensus, the major themes to be reported. Adopting this multi-phased research process delivered a collaborative perspective from practitioner and academic experts, to understand the challenges posed for developing and implementing an assessment of children's movement competency for teachers to administer.

## Findings and discussion

The aim of this study was to examine movement experts' perceptions of the most effective movement assessment framework for teachers to use in primary schools, with children aged four-seven years. In order to achieve this, we started with the perceptions of the primary school teachers, as they were the end-user. We then positioned their thoughts within a wider debate to interrogate the perceptions of academics that typically operate in a setting where assessing movement competence is conducted for research purposes with the end-user being, predominantly, stakeholders within interventions. Our primary aim was to bridge across these disparate, albeit symbiotically, connected domains in grappling with a solution that would meet the needs of teachers and researchers simultaneously. Our focal point was the development of the movement competence assessment tool but it was, perhaps unsurprisingly, revealing that the perspectives of what the tool needed to achieve was significantly different between the two groups of participants.

During the focus group discussions, a number of dilemmas emerged in relation to the development of a teacher-oriented assessment of children's movement competence. The way that these dilemmas emerged and were subsequently framed by participants provides an interesting characterisation of the data capture process and is useful in understanding the more detailed and specific comments regarding the dilemmas, that followed. As such, the ‘framing of dilemmas’ is presented as a precursor to the presentation of the dilemmas themselves, with these being: (a) why are we assessing children’s movement?; (b) how should we do it?; and (c) what should it look like?

*The framing of dilemmas.* As previously mentioned, there is limited evidence that provides an understanding of how to effectively design and develop a movement assessment framework for use by teachers in primary schools. There is, however, a plethora of studies that have used movement assessment frameworks to measure children's movement competence. These studies are typically cross-sectional in nature and rarely involve the teacher in the assessment in a way that supports the teacher's ability to use any resulting assessment data to have a consequential positive impact on the development of children's movement. In considering this situation, when asked to respond to tasks concerning the design of such a movement assessment framework, it seemed the participants were confronted with a series of dilemmas. Proposals for the potential design of a movement assessment framework were often mooted, only to be counteracted by other participants voicing the need for a more balanced approach, vis-a-vis a converse argument that represented a different paradigm of thinking. These competing notions of what constituted an effective movement assessment framework were generally juxtaposed between the needs of the research community in capturing movement competence data, as defined by the bulk of the existing research, and the needs of the educational context, as defined by the developmental needs of children and how teachers could meet these needs.

Previous studies in sports-related fields (e.g. Harvey, Cushion and Sammon, 2015) have conceptualized participants' dilemmas using Windschitl's (2002) dilemmas heuristic of: (a) pedagogical; (b) cultural; (c) political; and (d) conceptual dilemmas. Whilst participant responses from this study can be framed around some of Windschitl's (2002) themes to compare and contrast these findings with previous similar studies, the overarching use of such a framework is limited within this particular study for two reasons. Firstly, participants are experts, rather than teachers,

and are being tasked to envisage the complexities of a movement assessment framework in PE, to be used by a primary school teacher. As the framework was designed to interpret the dilemmas teachers themselves face during their teaching, the use of third party perspectives, as provided by experts, is limiting. Secondly, whereas Windschitl (2002) presented dilemmas within particular frames of reference (i.e. pedagogy, cultural), it became obvious that dilemmas articulated by experts in this study became increasingly framed as dichotomous to each other. For example, a dilemma emerged as to whether the assessment setting should be naturalistic or engineered (see Figure 1). ten Cate (2015) suggests that the emergence of this method of framing the argument in such an either-or manner is not without flaws; there is the potential for a false dichotomy to emerge, in which alternative solutions are crowded out by the offer of strongly polarized perspectives. Indeed, he suggests that such false dichotomies are not useful and, furthermore, could prove detrimental in achieving any intended goal.

It is plausible to suggest that the use of certain parameters when shaping the focus groups could have caused these dilemmas to emerge in this way. Simply by constructing expert perspectives around the subsequent production of a movement assessment framework could have influenced the focus groups as the researchers were striving for conclusive responses to inform this production. However, there was also a sense that the experts were coming to terms with a field of discussion that they would not ordinarily engage in and this level of uncertainty was also a potential cause for their polarized responses. Participants were, perhaps, making sense of the debate by positioning themselves at either ends of the spectrum and not fully considering alternative options that existed between the polar ends. Table 3 represents these dilemmas:

[Insert Table 3 here]

*Why are we assessing children's movement? Is it to measure children's competence or improve teaching and learning?* Within this theme, experts rationalised the various, differing, perspectives on why the movement assessment was being conducted and what the intended outcomes of such an assessment were believed to be. Within this dilemma, there emerged a clear distinction between the assessment of children's movement competence for research purposes or to inform pedagogy and, therefore, have an impact upon children's learning within PE. An academic expert exemplifies an example of these competing intentions, when they reflect upon the proposed use of a less structured approach to movement assessment than is currently offered by the majority of movement assessment frameworks:

> I think what's happened there is that you're losing control as a researcher... It will not be the same movements each time if I don't know the [assessment] dimensions...The motor control fraternity is now coming in and saying 'OK, that reliability is going to be confusing... (A3)

In response, A2 adds further weight to the dilemma:

> And that's where I'm making the differentiation from a research study, with a research hat on, to actually being in the setting as a teacher who is actually worried or concerned about the development of some kids. (A2)

Whilst the suitability of the majority of existing movement assessment frameworks is predicated on the establishment of the assessment's reliability and validity, it seems experts here are proposing that there are wider criteria for establishing the usefulness of a movement assessment framework for use by primary teachers. Hermann et al., (2015) claim that the implementation of their movement test battery fulfills the functions of both 'system monitoring' (information on the educational system's performance) and 'school development' (reports on pupils' performance affecting

internal reform for quality measures). Whilst there is no empirical evidence within their study to support this claim, it is interesting that the authors rationalise their outcomes around how children's movement assessment could be used as a way to measure both the school's and children's progress. What is equally interesting in the second point is that there is an assumption that reports on pupil performance will, in some way, affect internal reform; here, it is assumed that the use of a teacher-oriented movement assessment framework would result in an improvement in pedagogy related to movement development.

Whilst most experts deem the quantification of a child's movement competence as an important rationale for assessing children, the link to the enactment of the three messages of knowledge development (assessment, pedagogy and learning) proposed by Hay and Penney (2015) seems equally strong. Hay and Penney (2015) suggest that authentic assessment readily involves the child in the assessment process, in order to ensure assessment for learning, and a practitioner expert relates to this notion:

> That's the key... Even from infant school, children are becoming really proficient at knowing what their own and each other's strengths and weaknesses are… If they know, in very simple terms, what those [movement] criteria are, they're almost going to be harder on each other than the teachers are. (P2)

The discussion developed around how the movement assessment framework would be perceived by children as part of their learning, rather than solely for assessment purposes. In response to the notion that the movement assessment framework would be established as a stand-alone component of a lesson, an academic expert replied:

> But that's what you don't do though, I don't think you have to, because the assessment isn't an assessment per se, it's within a lesson…It's getting that balance, isn't it, with a formal assessment, that within that, actually we're developing the balance. (A4)

*How should we do it? Should the assessment setting be 'natural' or 'engineered'?*

Most existing movement assessment frameworks involve an 'engineered' setting in that the assessment is specifically manufactured to capture data related to children's movement competence. In these types of assessments, participants typically perform a series of movement tasks, or a single task, in a specific order, in a circuitous manner. Parameters are placed on how the participant performs the task in the way that they must respond to an assessor's instructions. Within these engineered settings, there is minimal regard as to whether the movement is typical, in that the child is in a 'natural' setting; a natural setting within a school might entail the child's typical engagement in a PE lesson or playground activity. Experts in this study suggested that a natural setting could provide a more accurate measurement of a child's movement competence.

> P2: 'I think that we should look at a more natural environment to assess. So a play kind of environment to assess.'
> Interviewer: 'Why is that?'
> P2: Because I think all these generic underpinnings things that we're talking about here are all required for everyday life, and I think the natural environment that we live in, by the nature of it, encourages those basic skills to be developed. '

It seems that this dilemma is borne out of what Windschitl (2002) refers to as a conceptual dilemma; conceptual dilemmas reflect the participant's understanding of learning, involving their ideologies and assumptions. In these dilemmas, there is a reconciliation of epistemological and ontological underpinnings with the pedagogical demands of the subject content. This form of assessment is clearly at odds with more recognized assessment protocols that usually involve the establishment of rigorously administered movement tasks, using strict guidelines that ensure reliability (Cools et al., 2008). It seems that this dilemma also questions the authenticity of a movement

assessment framework that is attempting to capture the movement competence of children in a structured and, therefore, unnatural way. Hay and Penney (2009) would perhaps suggest that an engineered form of assessment would fall short of an authentic, integrated assessment in PE, due to its lack of connectedness with the real world.

McEvilly et al. (2013) have raised similar concerns around the use of structured forms of movement assessment frameworks and note the potential discord that could result in using such engineered assessment with young children. It seems that the dilemma portrayed here emanates from a certain ideology that entails the capture of a child's movement competence in as natural a setting as possible. However, the challenge in assessing movement in such a free-flowing, unstructured, naturalistic setting is encapsulated by A2's comments:

> During free play you can't dictate. You can't tell the child exactly what skill you want them to do; therefore, you can't box it. So which box do you tick on? Do I tick on the running, or do I tick on the hopping, when the kid's actually doing a bit of both in this particular game in the playground?

*What should it look like? What is the appropriate balance between simplicity and complexity?* Simplicity, in this context, was generally described as a movement assessment framework that could be used to assess children's movement competence within the confines of a typical PE lesson, by a non-PE specialist teacher, in a timely manner. Furthermore, it has previously been reported that primary school teachers lack knowledge (Morgan and Hansen, 2007) and confidence (Harris, Cale and Musson, 2011; James, Griffin and France, 2005) of assessing within PE, suggesting that simplicity is even more paramount within this specific environment. Complexity, more often than not, related to the amount of movement assessment information needing to be captured to form a valid and reliable perspective of a child's movement

competence. Hermann et al. (2015) reflect this dilemma in their development of the MOBAK movement assessment framework by stating 'The goal is to develop a valid test instrument whose tasks ensure a simple and practical evaluation' (p.81) and the following dialogue characterizes this succinctly:

> A2: Is it compulsory for the primary school teacher to assess PE in the UK?
> Interviewer: No.
> A3: So then it goes back to that. It has to be simple, otherwise they don't want to do it. It has to be so engaging they can't not want to do it [sic].
>
> I think we just have to be mindful of whatever we put out there - particularly for a non-specialist teacher at primary - has to be really, really basic and simple, as basic as you can make it, but still effective. (P1)

For some experts, simplicity also entailed the amount of time the assessment would take and whether this could be configured to the typical duration of a PE lesson. Longmuir et al. (2015) justified the estimated assessment time of one and a half to two minutes per child to complete the the Canadian Agility and Movement Skill Assessment (CAMSA) by comparing it to the typical time required for fitness protocols currently used for population surveillance (Tremblay et al., 2007). A stronger justification would perhaps need to entail the ability of a teacher to effectively assess the children within the constraints of a PE lesson. The time taken to complete the use the movement assessment framework for all children was often presented as a dilemma:

> I think there needs to be something that's easily measurable, but also easily done by a large number of people at the same time. I was just thinking about it being a teaching class, in a class situation, if you've got 30 children, you don't want to be going through a whole batch of tests. (P3)
>
> I think really, while trying to develop something that no-one's ever done before, it's being very realistic about what we want this tool to do, without trying to create something so unwieldy and actually we end up with something very complex that doesn't really do what we need it to do (P1)

*Should the tasks be static or dynamic?* This dilemma emerged as a complex, often sequentially framed, construct relating to the nature of tasks recommended by experts for assessing children's movement by primary teachers. The discussion related to the best way to assess the progression of the child's movement competence, using static tasks, more dynamic and free flowing demonstrations of movement competence, or a combination of both. It seemed that the age range of the intended users of the movement assessment tool had an influence on responses with a synonymous escalation into increasing the demands of the task. This meant that the task would have to initially challenge the child's movement in isolation, before progressing to more dynamic modes of movement:

> I'd prefer to assess the dynamic elements of balance, more than the static elements. I look at both, but really, in a way, I think, concentrating on one doesn't give you the full picture… that kind of period of destabilising your body. (P1)

Whilst there was an initial discussion around the suitability of skills in isolation as opposed to the ability to demonstrate movement competence in more dynamic situations, other experts went further in their understanding of dynamism by referring to the potential for use of an obstacle course setting for movement assessment, as captured by the following interaction:

> P3: For something like an obstacle course you would have to set it up in such a way that they had to perform the moves you want them to, but you don't tell them, so they would have to do that. I think there would have to be some form of structure because otherwise some of these [movements] they may never do.
>
> P2: It would be really good to have an 'in context' movement thing, and then a test situation. I think that's a fab idea. Brilliant idea.

The use of more dynamic, contextually-relevant, forms of movement assessment has gained prominence in recent years (Logmuir et al., 2015; Francis et al., 2016). Longmuir et al. (2015) developed an obstacle course setting to assess the movement

competence of children aged eight-12 years, through their construction of the CAMSA. The authors used a Delphi technique to ascertain expert opinions to inform the construction of CAMSA and opinions were diverse in relation to use of an obstacle course to assess movement competence. Of the seven experts in motor skill development and competence, only two strongly believed that determining skill quality should be the sole purpose of the assessment, and that children should complete the obstacle course without the potentially negative impact of time pressure. The remaining five expert participants supported the obstacle course as a complete measure of motor skill. Longmuir et al. (2015) rationalised the use of their development of a dynamic obstacle course by suggesting that static testing of isolated skills does not reflect the static and dynamic physical activity environments typically found in childhood. Furthermore, the authors contend that requiring children to perform skills in isolation, as typically found in the majority of movement assessment frameworks (Folio and Fewell, 2000; Ulrich, 2000), is time and resource intensive (Longmuir et al., 2015).

CAMSA (Longmuir et al., 2015) is targeted at peri-adolescent children aged eight-12 years and, as such, involves children on the cusp of a movement development stage, as purported by Gallahue et al. (2008), in which children develop from fundamental to complex and then onto functional movement competencies. Experts advising on the development of CAMSA (Longmuir et al., 2015) reached consensus in rationalising the inclusion of speed in the movement assessment task as a child with greater physical literacy would be able to select the appropriate speed for optimal skill performance, whilst their less able peers would perform them more slowly or too fast. The dilemma emerging here is around the necessity to create a meaningful, authentic assessment that is connected to the child's real world, whilst

recognising the potentially developmentally inappropriate introduction of time-pressured (speed) elements to the assessment with children at an early stage of movement development.

## Conclusions

These results suggest the development of a FMS assessment protocol for use by primary teachers needs to consider the multidimensional complexities of assessing children's movement in relation to the specific context in which the assessment will be conducted. The postulated dilemmas presented as a result of this study provide a basis for subsequent research in this field. The dilemmas could be used as a platform to design an actual movement assessment framework as well as being a point of reference to consult a wider range of practitioners; for example, the teachers themselves.

It is clear from the findings that experts believe that there are dilemmas that need resolving in order to design a movement assessment framework for teachers. Given the wide-ranging nature of these dilemmas it is questioned whether existing movement assessment frameworks in their current form, predominantly designed and used by researchers, offer a credible basis for the design and development of a movement assessment framework to be used by primary school teachers. At the core of this uncertainty lies the origination of movement assessment frameworks and, although there is some, albeit limited, research on how teachers have been involved in the design of such assessments, their intended use as ways of measuring movement competence, as evidenced by the child's ability to perform FMS. Participants from both practitioner and academic backgrounds in this study constantly question the purpose of the assessment; a tangible tension exists in the differing perspectives

offered, with practitioners arguing for a simple tool that will inform future learning and academics questioning the reliability and validity of such a tool in terms of accurately assessing children's movement in a way typically achieved through the use of existing protocols.

The context used for the deployment of existing movement assessment frameworks is often schools, yet little consideration is given to the potential for information gleaned from the assessment to be used in a way that subsequently supports the child's learning or informs the teacher's pedagogy. This is not unsurprising as the teacher is rarely involved in either the design or use of the protocol and many of the protocols could be viewed as complex to a non-specialist teacher teaching PE in a primary school. It is likely, therefore, accepting the perspectives of participants in this study, that the development of movement assessment frameworks for use by primary teachers of children aged four-seven years can mirror existing protocols in terms of the movements assessed. However, such development might initially focus less on reliability and validity of the tool, whilst effectively responding to the unique context in which the tool will be used and the expertise of the person using it. Notable for its absence in this study is experts' mention of the role of children in the assessment, which brings into question the authenticity of the assessment as assessment for learning (Tolgfors and Ohman, 2016). The importance of involving the child in the assessment of their own movement competence, as part of assessment *for* learning, seems justified when considering the tendency of younger children, in particular, to inflate their perceptions of their movement competence (Stodden at al., 2008) and leaves us to concur with Barnett and colleagues' (2016) call for more research which examines, compares and contrasts pedagogical strategies to optimize the learning and development of FMS. In a similar vein, experts disregarded the notion of what

Hermann et al. (2015) refer to as ‘curricular validity’, in which the movement assessment relates to the standards espoused by the country or region in which the research was located. This perhaps suggests that the PE curriculum in the UK lacks sufficient status to be considered, particularly in light of its non-statutory nature and also increases the need to focus on movement development of children when the national standards seem to be so irrelevant. Or, perhaps, the fact that the only reference to FMS within the national curriculum for PE in the UK is ‘pupils need to develop FMS’ (GOV.UK, 2013) renders its impact somewhat limited.

Some developers of movement assessment frameworks conclude their protocols are suitable for population surveillance, implying an appropriate feasibility to large-scale usage (Longmuir et al., 2015). The resources required to administer such surveillance, where specialist movement skill analysts are typically the only appropriately qualified administrators of the test, limit such a claim. For example, an analysis of documented studies in the UK in the past decade suggests an approximate total of 1,000 children’s movement competence has been measured (Bryant et al., 2014; Davis et al., 2011; Duncan et al., 2017; Flatters et al., 2014; Foulkes et al., 2015; Foweather et al., 2008; Morley et al., 2015), constituting just 0.03% of the age range of the UK population during that time (Office for National Statistics, 2015). Notwithstanding attempts by researchers to stratify participants to provide as representative a sample as possible, given the limited resources no doubt available, it is clear that a movement assessment framework to generate more data and better understand population estimates of children's movement competence is much needed. Providing teachers with an assessment framework that is easy to use, provides information for subsequent teaching and learning and is embraced by the teachers who are going to use it to assess the early years of children’s movement competence,

is one way to increase our understanding of the status of children's movement on a larger scale.

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